

## Claims

- [c1] 1. A method for correcting at least one of examination images and measurements acquired by a magnetic resonance imaging (MRI) device comprises:
- imaging a phantom of known structure at selected intervals to generate phantom images;
- performing automatic analysis of the phantom images relative to images of the phantom acquired at a previous time;
- calculating variations between respective phantom images; and,
- correcting the at least one of examination images and measurements using the calculated variations between phantom images.
- [c2] 2. The method of claim 1 wherein the correcting step is automatically initiated within an image processor of the MRI device.
- [c3] 3. The method of claim 1 wherein the phantom comprises an outer structure and a plurality of substructures contained within the outer structure, wherein the outer structure and substructures are constructed of respective materials having different signal strengths in a MR image.
- [c4] 4. The method of claim 1 wherein the examination images are acquired at a first imaging session and at least one successive imaging session for tracking progression of a given disease.
- [c5] 5. The method of claim 4 wherein the disease is a neurodegenerative disease and the examination images are used to generate volume measurements of a brain.
- [c6] 6. The method of claim 3 wherein the performing step comprises determining respective locations of the substructures within the respective phantom images.
- [c7] 7. The method of claim 6 wherein the calculating step calculates relative changes in the locations of the substructures to provide correction information.
- [c8] 8. The method of claim 1 wherein the correcting step generates corrected examination images and volume measurements are generated based on the

corrected examination images.

- [c9] 9. The method of claim 1 wherein the correcting step corrects volume measurements using a scaling correction map for adjusting the volume measurements.
- [c10] 10. A method for performing longitudinal examinations of a set of anatomical structures comprising:  
imaging the structures with at least one imaging device;  
performing an automatic correction process to correct for variations due to the imaging device or process;  
measuring selected regions of interest within the anatomical structures; and  
repeating the imaging, performing and measuring steps for at least one successive examination for tracking the measured regions of interest.
- [c11] 11. The method of claim 10 wherein the correction process comprises the steps of:  
imaging a phantom of known structure at selected intervals to generate phantom images;  
analyzing the phantom images relative to images of the phantom acquired at a previous time;  
calculating variations between respective phantom images; and,  
correcting at least one of examination images of the anatomical structures and measurements using the calculated variations between phantom images.
- [c12] 12. The method of claim 11 wherein the phantom comprises an outer structure and a plurality of substructures contained within the outer structure, wherein the outer structure and substructures are constructed of respective materials having different signal strengths in a MR image.
- [c13] 13. The method of claim 10 wherein the regions of interest are substructures within the brain.
- [c14] 14. The method of claim 10 further comprises a co-registration step to register successive images of the anatomical structures.

- [c15] 15. The method of claim 10 wherein the correction process corrects due to different imaging devices.
- [c16] 16. A system for performing Magnetic Resonance Imaging (MRI) examinations comprising:  
an imaging device for acquiring images of regions of interest within a subject and a phantom of known structure; and,  
an image processor adapted to analyze images of the phantom and calculate scanner related variations and further adapted to automatically correct at least one of images of regions of interest and measurements of the regions of interest within the subject based on the calculated variations.
- [c17] 17. The system of claim 16 wherein the phantom comprises an outer structure and a plurality of substructures contained within the outer structure, wherein the outer structure and substructures are constructed of respective materials having different signal strengths in a MR image.
- [c18] 18. The system of claim 16 wherein the images of the regions of interest are acquired at a first imaging session and at least one successive imaging session for tracking progression of a given disease.
- [c19] 19. The system of claim 18 wherein the disease is a neurodegenerative disease and the images of the region of interest are used to generate volume measurements of a brain.
- [c20] 20. The system of claim 16 wherein the image processor is further adapted to automatically correct measurements derived from the images of the regions of interest.